

Defining Success	<b>OBJECTIVE:</b> What will your students be able to do by the end of class?	
	Alg 1.9B Students will be able to investigate, describe, and predict the effects of changes in $a$ and $c$ on the graph of $y = ax^2 + c$ . (Power Objective)	
	<b>ASSESSMENT:</b> How will you know concretely that all of your students have mastered the objective?	<b>KEY POINTS:</b> What three to five main ideas or steps will you emphasize in your lesson? May also include key questions to ask during instruction.
	Students will discriminate between linear and quadratic data using finite difference. Students will use transformed of $y = x^2$ to predict the graph of $y = ax^2 + c$ .	<ul style="list-style-type: none"> <li>Using technology show how these transform transformations differ <math>y = x^2 + 2</math> and <math>y = (x + 2)^2</math></li> <li>Explain the finite difference process quadratic pattern data.(rate of change)</li> <li>How does the quadratic transformation relate to the 8<sup>th</sup> Gr. Geometry transformation?</li> </ul>

Lesson Cycle	<b>ENGAGE:</b> Get the students' minds focused on the topic (short; question or picture) "I have ...Who has?" Card game: Ask each group to find the pairs of card that match. The cards review linear functions concepts, and geometric transformation.( From 4.3 Prerequisites/Background Knowledge and learning focus 3.1)	<b>MATERIALS</b> Color Tiles Graph sheets Card game
	<b>EXPLORE:</b> Provide students with a common experience Students will work in groups to create different sized squares using color tiles provided to them: ( assume each square tile has area of 1 square inches) <ul style="list-style-type: none"> <li>Complete the data tables for perimeter and area</li> <li>Graph each table ( discrete data)</li> <li>Discuss the difference between the perimeter and area tables and graphs</li> </ul>	
	<b>EXPLAIN:</b> Teach the concept. Should include interaction between teacher and students. Using TI, the students (in pairs) will graph the quadratic functions a) $y = x^2$ b) $y = 2x^2$ c) $y = 5x^2$ d) $y = \frac{1}{2}x^2$ e) $y = \frac{1}{4}x^2$ f) $y = -3x^2$ g) $y = -\frac{2}{3}x^2$ They will describe in words the effects of the changes in "a" (whole number, negative, fractions) Using TI, the students (in pairs) will graph the quadratic functions: a) $y = x^2$ b) $y = x^2 + 1$ c) $y = x^2 + 4$ d) $y = x^2 - 3$ e) $y = 3x^2 - 5$	
	<b>ELABORATE:</b> Students apply the information learned in the Explain They will describe in words the effects of the changes in "c" (positive, negative, up, down, translate/shift)	
	<b>EVALUATE:</b> How will you know the students have learned the concept? Ask the groups to report in front of the class about a) $a =$ positive whole number b) $a =$ negative whole number c) $a =$ fractions d) $c =$ positive e) $c =$ negative	



# Questioning and the 5E Lesson

Subject/Lesson: \_\_\_\_\_

Objective: \_\_\_\_\_

Stage of 5E Lesson	Question	Bloom's Level
<b>Engage</b> Gets the students' minds focused on the topic.	<sup>graph of</sup> What does a linear function look like? What is a function? What happens when the slope or the y-intercept changes?	<input type="radio"/> Remember <input type="radio"/> Understand <input type="radio"/> Apply <input type="radio"/> Analyze <input type="radio"/> Evaluate <input type="radio"/> Create
<b>Explore</b> Provides students with a common experience.	What do you notice between the two graphs? What do you think cause the second to not be linear? What can you say about the first or second difference?	<input type="radio"/> Remember <input type="radio"/> Understand <input type="radio"/> Apply <input type="radio"/> Analyze <input type="radio"/> Evaluate <input type="radio"/> Create
<b>Explain</b> Teaches the concept with interaction between the teacher and students.	Is this a graph of a function? ↗ How does the coefficient of $x^2$ affect the graph? How does the "c" affect the graph? How does negative affect the coefficient of $x^2$ ?	<input type="radio"/> Remember <input type="radio"/> Understand <input type="radio"/> Apply <input type="radio"/> Analyze <input type="radio"/> Evaluate <input type="radio"/> Create
<b>Elaborate</b> Provides opportunity for students to apply the concept in a new situation.	What do you think will happen if <del>the</del> "a" doubled and "c" diminished by 4 in the parent function? Summarize the effects of <sup>the</sup> changes in "a" and "c"?	<input type="radio"/> Remember <input type="radio"/> Understand <input type="radio"/> Apply <input type="radio"/> Analyze <input type="radio"/> Evaluate <input type="radio"/> Create
<b>Evaluate</b> Allows students to demonstrate understanding of the concept and facts.	Teacher made questions	<input type="radio"/> Remember <input type="radio"/> Understand <input type="radio"/> Apply <input type="radio"/> Analyze <input type="radio"/> Evaluate <input type="radio"/> Create

# Analysis of a 5E Lesson

Subject/Lesson: Algebra I Objective: SWBAT investigate, describe, predict changes in  $a$  and  $c$  on the graph of  $y = ax^2 + c$

Stage of 5E Lesson	Teacher Role	Student Role	Suggestions
<b>Engage</b> Gets the students' minds focused on the topic.	Monitor Access prior knowledge	Active participation	
<b>Explore</b> Provides students with a common experience.	Facilitator	Records observations	
<b>Explain</b> Teaches the concept with interaction between the teacher and students.	Model	collaborating & connecting	
<b>Elaborate</b> Provides opportunity for students to apply the concept in a new situation.	Extend students knowledge Guide the flow of reporting	Report <del>to</del> in front of the class Apply acquired skills	
<b>Evaluate</b> Allows students to demonstrate understanding of the concept and facts.	Assessor		